Research Topic:

"DOCUMENTATION, CREDIBILITY ASSESSMENT AND VALIDATION OF ETHNO-VETERINARY PRACTICES OF BULDHANA DISTRICT (MAHARASTHRA)"

SYNOPSIS

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1. INTRODUCTION:

Since cave age humans are treating their animals using traditional veterinary medicine, but this knowledge was only recorded properly in recent times. The technical term to define such type of knowledge termed as 'Ethno-veterinary' by McCorkle (1986).

Ethno-veterinary practices (EVP) is the scientific term for traditional veterinary practices which include the knowledge, skills, methods, practices and beliefs about animal healthcare found among the farm labors, farmers, and specially *vaidus*. The knowledge of traditional veterinary practices differs not only from region to region but also among and within communities especially tribal communities.

Ethno-veterinary medicines (EVM) comprises all approaches applied by humans to improve their livestock production, like breeding practices, herbalism, animal feed technology, ritualism, spiritualism and ethno-epidemiological knowledge on livestock diseases. The ethno-veterinary practices (EVP) include the use of medicinal plants, surgical techniques and management practices to diagnose, prevent or treat a wide variety of diseases. In India, most of the work has been carried out to document the ethno-veterinary medicines but very less on ethno-veterinary practices (EVP).

At least 80% of people in developing countries depend largely on the traditional practices for control and prevention of various animal diseases (World Health Organization).

There had been evidence on the existence of literature on veterinary science in Rigveda (2000-4000 B.C.). The nucleus of veterinary science (*Pashu Ayurveda*) existed in Atharveda which is a repository of therapeutic hints and prescriptions. Section VI of Atharveda which deals with the human medicine also deals with the veterinary science (Atharveda, VI, 59; 11, 26, 1, 11, 14).

Ethno-veterinary medicine is developed by farmers and local livestock holders in the field and barns rather than in scientific laboratories. This knowledge is usually transferred from one generation to the next by words of mouth rather than writing. That is why it is in danger of extinction thus to conserve ethno-veterianry practices and its validation is urgently needed.

Vidarbha is the eastern region of the Indian state of Maharashtra comprising of 11 districts. It borders the state of Madhya Pradesh to the north, Chhattisgarh to the east, Telangana to south and Marathwada & Khandesh regions of Maharshtra to the west.

Buldhana district located at the westernmost border of Vidarbha region and is lies between 19°51' to 21°17' North latitude and 75°57' to 76°59' East Longitude. It is bounded on the North by Madhya Pradesh, on the South by Parabhani District on the west by Jalna and Jalgaon Districts and on the North East by Amravati and Akola District. The principal rivers in the district are Painganga and Purna. The other important rivers are the Khadakpurna, Nalganga, Vishwaganga and Dnyanganga. There are two medium irrigation project of the river Nalganga and Dnyanganga in the district. The total area of the district is 9661 Sq. Kms. which is about 3.14% of the total area of Maharashtra State. During the year 2010-11, an estimated 840.66 Sq. Kms of area was under forest which constituted 8.70% of the total area. The Buldhana district consists of 13 tahsils and 1433 villages.

It is a land of small holdings and 70% of population practice subsistence agriculture, but the most tribal and farmers are not self-sufficient. They have to rear domestic animals such as oxen, cows, buffaloes, goats and sheeps. As per the 19th livestock census (2012), there are total numbers of cattle was 479658, buffaloes were 119618, sheep were 105618 and goats were 263606 in the Buldhana district.

Maintaining and rearing of cattle plays a very important role in agriculture based rural economy as they are useful in agriculture related needs. There is one district veterinary polyclinic at district level and 6 taluka veterinary mini-polyclinic & veterinary dispensaries of grade-I are 35 and Grade-II are 86 in the Buldhana district. This number is very less as compared to total livestock population. To maintain such big population of livestock, ethnoveterinary practices have been developed. In most localities, no organized veterinary medicinal aid is available; therefore, they depend mainly on the local herbal medicines. The animals are treated with plant remedies on the basis of ethnoveterinary knowledge.

So, most of the farmers & tribal depend on traditional ethnoveterinary practices as they are cheaper, easily available and effective, especially in rural areas where veterinary services are irregular or absent and expensive. At this level, indigenous animal health systems are used for emergency purposes.

The district of Buldhana is fairly rich from the point of biodiversity (Diwakar and Sharma, 2000), agrobiodiversity and diversity of human culture (Anonymous, 1976).

The people belong to 15 scheduled castes, some artisan castes e.g. Sutar, Lohar, Beldar, Kumbhar, Panchal, Ghisadis, Pathratas, Rangari, etc., apart from forward caste people. The common tribal of the region includes Bhill, Nihal, Korku, Pawara, Barella and Bhilala. They inhabit rural and tribal hilly areas of the district.

Although the traditional use of some ethnoveterinary plants has been documented, the effectiveness of most plants used as ethnoveterinary medicine has not yet been tested. This makes it necessary to conduct scientific studies aimed at efficient and appropriate use, without the risk of intoxication. The aim of present study is to analyze the traditional use of plants and its validation.

2. REVIEW OF LITERATURE AND DEVELOPMENT IN THE SUBJECT (Previous work done in the relevant area):

Much work has been done in the field of documentation of ethno-veterinary practices in India as well as in other countries but very less or no work on its validation. The documentation on ethno-veterinary uses of medicinal plants among traditional herbal healers in Alaknanda catchment of Utttarakhand, India resulted into 73 medicinal plant species belonging to 70 genera and 45 families used against 34 livestock ailments have been recorded (Phondani *et al.* 2010).

In Rajasthan, study on animal healthcare practices by livestock owners at Pushkar animal fair was done and 43 plant species of ethno-veterinary medicinal uses have been recorded to treat 30 diseases of animals (Galav *et al.*, 2010).

Ethno-veterinary practices for treatment of skin diseases in cattle was carried out in Orissa, India and a total of 24 plants belonging to 20 families were documented during the study (Mishra, 2011).

Manoranjotham and Kamaraj (2016) documented ethno-veterinary usage of medicinal plants in Tamil Nadu, India. They recorded 50 plants belonging to different families used by local people to treat various animal diseases.

Documentation of ethno-veterinary practices from Birbhum district of West Bengal, India has been completed and 40 plants were recorded which are used in preparation of 36 types of ethno-veterinary remedies for curing 22 types of diseases and ailments (Mandal and Rahaman, 2014).

The knowledge of ethnoveterinary medicine of about 198 plant species belonging to 79 families has been recorded in Maharashtra, India (Somkuwar *et al*., 2015).

Survey and documentation of ethnoveterinary healthcare practices used by rural people of Akola district of Maharashtra has been carried out by Jambu and Wath

(2018) and documented 93 plant species of 83 genera belonging to 43 families used in 139 plant preparations to treat 22 types of animal diseases.

Buldhana district has been surveyed mainly for ethno-botanical studies but few reports are published on ethnoveterinary medicines.

Marathe *et al.* (2010) documented traditional veterinary practices which includes 25 plant species belonging to 19 families used to treat common ailments of livestock population of Khamgaon taluka, Dist. Buldhana.

Patil *et al*., (2010) recorded 80 plant species belonging to 44 families used as veterinary medicine in Buldhana District.

Pocchi (2011) has been documented 111 plant species from 103 genera belonging to 55 families used in the treatment of 44 diseases of domestic animals from Buldhana.

A survey on ethnoveterinary practices by tribal of nearby villages of Dnyanganga wildlife sanctuary, Buldhana, Maharashtra carried out by Patil and Rothe (2017) resulted into remedies for 17 veterinary diseases.

Although, Buldhana district has been survey and documented for ethnoveterinary medicines (EVM) but very little information is available on detailed ethnoveterinary practices (EVP) and no information regarding its validation. So, the documentation of ethnoveterinary practices along with scientific validation of Buldhana district is needed for evaluating veterinary drug plants. Therefore, present study will be beneficial to fill the gap that might have not covered due to the negligence in documentation of ethnoveterinary practices.

3. OBJECTIVES OF RESEARCH/ PROPOSED HYPOTHESIS:

Main objectives of present research work are as follows:

1. To document the ethno-veterinary practices of Buldhana district.
2. To assess credibility assessment of the documented ethnoveterinary practices by using statistical analysis.
3. To record case studies data for selected animal diseases for its validation.
4. To screen the selected ethno-veterinary medicinal plants for bioactive compounds and anti-microbial activities.

4. METHODOLOGY TO BE ADOPTED:

Phase I: Documentation and credibility assessment of ethno-veterinary practices:

Extensive field survey will be done to document ethnoveterinary practices which are used by ethno-veterinary medicine practitioners, rural and tribal people of different parts of Buldhana district. A survey sheet/ data sheet will be carefully prepared for

documentation. Field survey will be carried out in such a way that data will be useful for credibility assessment using statistical analysis. Weekly tours will be organized with the local informants to observe the ethno-veterinary practices in rural as well as tribal areas of the region. Local or tribal people will be interviewed in most formal way. Personal details about informants will be entered on data sheet. Information like the name (common/vernacular/ local name) of plant, the parts used, mode of use, name of animal disease treated, ingredients used, method of crude drug preparation, route of drug administration, method of application, dosage, period of treatment etc. will be noted down.

The credibility assessment of ethnoveterinary practices of Buldhana district will be carried out by using statistical analysis of data collected during field survey and literature survey. The statistical analysis includes use value (UV), informant consensus factor (ICF), fidelity level (FL), Relative Reliability Index (RRI) etc.

The ethno-veterinary medicinal plant species will be collected during the field trips and will be brought to the laboratory. Plant species will be identified using standard floras (Naik, 1998; Sharma *et.al*.1996; Singh & Karthikeyan, 2000; Singh *et al.*, 2001).

Herbarium specimens will be prepared and deposited in the standard herbarium.

Phase II: Case studies for validation:

For the case studies some common animal diseases will be selected on the basis of field survey and important disease of the region. Actual ethnoveterinary treatment will be recorded with the consent of ethnoveterinary practitioner under the supervision of certified medical practitioner. Also the details of modern veterinary medical treatment will be recorded for the same disease with the help and consent of regular certified veterinary doctors. This will help to understand whether the ethnic practices are more effective, less effective or parallel effective in comparison to modern medicine.

Information regarding animal diseases and its symptoms, the ethno-veterinary medicinal plants used, crude drug preparation, dosage given by ethnoveterinary practitioner along with results and recovery time will be recorded.

Entire ethnoveterinary case studies' procedure will be photographed and filmed.

Phase III: Phytochemical studies:

For phytochemical studies, some important ethnoveterinary medicinal plant species from documented ethnoveterinary practices will be selected having very little or no information about their phytochemical properties or having high Use Value (UV). For analysis fresh material as well as dry powder will be used for further studies.

Bioactive compounds: For evaluation of medicinal properties, plant tissue will be tested qualitatively for various bioactive compounds which include secondary metabolites like **Alkaloids** (Nervous system depressant, Anti-microbial); **Flavonoids** (Antioxidant, Anti-inflamatory, anti-allergic, anticarcinogenic, antiviral and antibacterial); **Tannins** (Anti-carcinogenic, Anti-mutagenic, Anti-microbial and Anti-inflammatory); **Steroids** (Anti-inflammatory); **Saponins** (haemotoxic which exhibits haemolytic property causing haemolysis of erythrocytes) etc. Detection of bioactive compounds will be done by standard prescribed methods (Evans, 1997; Gibbs, 1974; Gupta & Varshney, 1997; Harborne, 1973; Kokate *et al.*, 1998; Kulkarni & Apte, 2000; Peach & Tracey, 1979; Sadasivam & Manikam, 2005; Thimmaiah, 1999).

Phase IV: Evaluation of antimicrobial activity:

Antimicrobial activity of selected ethnoveterinary medicinal plant species will be determined by using standard prescribed methods (Bauer, 1966; Cappuccino & Sherman, 1996).

5. IMPORTANCE OF STUDY/SOCIETY APPLICATION:

- **International status:** It is estimated that about 80% of the world's population rely on traditional medicine particularly herbal medicine for primary healthcare (Abbiw *et al.*, 2002). In developing countries, livestock farmers do not have access to conventional medicines. They see the use of medicinal plants as an alternative due to ever increasing economic failure. Knowledge of the curative properties of specific plants is an accomplished art. This art is still maintained in Bangladesh, especially in rural areas.

  Bangladesh is endowed with more than 5000 plant species and about 1000 of them are medicinally important (Ghani, 1998).

  The need to preserve a disappearing ethnoveterinary heritage is compounded by problems within the modern veterinary health sector in Zimbabwe (Matekaire and Bwakura, 2004).

  The traditional knowledge on ethnoveterinary folk medicine has been recognised during the 32nd session of UNESCO as one of the important components of indigenous cultural heritage that need to be studied, sustained and protected (Anonymous, 2005). Since then, scientific studies and documentation of indigenous knowledge on ethnoveterinary medicinal plants have been initiated in many countries like Mediterranean areas of Albania, Italy, Morocco, Spain, Egypt, Greece, Canada (Lans *et al.*, 2007), South Africa (McGaw and Eloff, 2008), Brazil

(Monteiro *et al.*, 2011), Argentina (Martinez and Lujan, 2011), and Spain (Benitez *et al.*, 2012) and Germany (Pieroni *et al.*, 2005). However, the effort is still quite insignificant when compared to the undocumented global ethnoveterinary plant lore.

A recent bibliographic compilation provides data from 118 countries all over the world regarding 200 health troubles in 25 livestock species (Mathias, 2001).

- **National status:** In India, enough attention has not yet been given to the traditional veterinary herbal remedies. Even the *Rigveda, Atharvaveda* and 8 divisions of *Ayurveda* the pioneer documents with curative properties of plants, have not provided much information on veterinary remedies (Pal, 1984). There has been a rich traditional and indigenous knowledge about animal healthcare in India.

  There is a rich and efficient ethnoveterinary traditions exist in the villages of India which form integral part of the family and plays an important social, religious and economic role. They comprise of belief, knowledge, practices and skills pertaining to health care and management of livestock. There are local healers who are knowledgeable and experienced in traditional veterinary health care. They use the locally available medicinal plants for treatment of animals.

  A lot of efforts have been made to document information on herbal veterinary medicines in India like in Bengal, Orissa and Bihar (Pal, 1980), Sikkim Himalaya (Bharati and Sharma, 2012), Uttaranchal (Pande *et al*., 2007).

  Widespread interest in documenting and validating ethnoveterinary practices arose in the early 1980s. Since then; several studies have been carried out, many reports written and numerous conferences and workshops held. Recent efforts to promote the use of ethnoveterinary knowledge worldwide, much information is only documented in field reports and scientific publications. Ethno veterinary medicine can make an economic difference, but its cost-effectiveness varies, and depends on many different factors. In-depth studies are needed to determine how the economic potential of ethno- veterinary medicine can be best utilized.

- **Significance of the study:** Literature shows the worldwide interest in herbal products has grown significantly. For instance cattle, horses, sheep, goats and pigs represent about 70% of the animals treated with herbal remedies, followed by poultry (9.1%), dogs (5.3%) and rabbits (4.3%). The supply of veterinary health services and medications is constrained by scarcity, erratic supply, and prohibitive cost. Although an extensive network of veterinary hospitals exists, a poor

communication infrastructure and a shortage of manpower drives livestock owners to treat animals themselves, consult a local healer, or slaughter the animal if the cost of treatment becomes a significant proportion of the value of the animal. Traditional healers do not charge for their services; they are paid in kind by satisfied customers. Reliance on ethnoveterinary knowledge in different countries is mostly reinforced by the strong dependence on livestock for livelihood and the richness in cultural history, ancestral knowledge and biodiversity. Ethnoveterinary Medicine system widely practiced in rural areas where modern health care services are limited and even in areas where conventional veterinary service is available. It is deep rooted and rational practice for rural communities that can contribute better to animal health management. Therefore, use of plants in ethnoveterinary practice has proved itself to be a potential resource for the community based animal health care activities throughout the world.

6. PROPOSED WORK PLAN / FORMULATION AND STRUCTURE OF STUDY: (Year wise plan of work and targets to be achieved)

Present research will be carried out in three years. Year wise plan of this work is as follows:

- **First year:** Extensive field survey will be done to document the knowledge of ethnoveterinary practices used by ethno-veterinary medicine practitioners, rural peoples and tribal of different parts of Buldhana district. Statistical analysis will be done based on collected data on ethnoveterinary practices during field surveys for scientific validation. Collection of the selected plant species from the fields. Preparation of the plant material for analysis.
- **Second year:** Field survey or documentation of ethnoveterinary plants**.** The case studies performed by ethnoveterinary practitioners for selected domestic animal diseases will be recorded under the supervision of certified veterinary medical officer. Phytochemical studies of selected ethnoveterinary plant species include qualitative estimation of bioactive molecules.
- **Third year:** Evaluation of antimicrobial activity. Preparation of final synopsis and thesis writing.

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